Amendments

In the Claims:

1. (Previously presented) A system for modeling an elongated object, said elongated object being located internal to a body, said system comprising:

a magnetic field generator generating a localized magnetic field;

a radio frequency (RF) energy source generating pulsed RF energy directed towards a body located within said localized magnetic field;

a receiver receiving magnetic energy responsive to pulsed RF energy;

a gradient analyzer analyzing and extracting gradient information from received magnetic resonance energy;

a shape modeler interactively forming a tubular model of an elongated object in said body and impressing said model with extracted gradient information; and

a display displaying said elongated object model.

2. (Original) A system as in claim 1, wherein the gradient analyzer comprises:

means for extracting the gradient of received magnetic resonance data;

means for computing the magnitude of said extracted gradient; and

means for extracting the gradient of said gradient magnitude.

3. (Original) A system as in claim 1 wherein said shape modeler comprises:

means for interactively defining an axis in said elongated object;

means for defining a reference circumferential direction about said elongated object;

means for defining radial lines extending outward from said axis; and

means for selectively merging radial lines intersecting with one another.

4. (Original) A system as in claim 3, wherein axis points are interactively provided to said axis defining means by a user, said system further comprising:

means for interpolating said axis from said provided axis points.

5. (Original) A system as in claim 4, wherein said interpolation means connects axis points using a b-spline.

6. (Original) A system as in claim 4, wherein the reference circumferential direction is defined as a function of axial position.

7. (Original) A system as in claim 4, wherein radial lines are defined extending outwards from said axis for all axial and circumferential positions.

8. (Original) A system as in claim 1, wherein said shape modeler comprises:

means for initializing all radial and circumferential positions of an initial model responsive to extracted gradient information, said gradient information representing image and smoothing forces at each radius; and

means for deforming tubular model vertices subject to said image and smoothing forces.

9. (Original) A system as in claim 8, wherein said body is a human body.

10. (Original) A system as in claim 9, wherein said elongated object is a blood vessel said display displaying a surface model of said blood vessel.

11. (Original) A system as in claim 10, wherein said blood vessel is the carotid artery.

12. (Original) A system as in claim 10, wherein said blood vessel is the renal artery.

13. (Original) A system as in claim 1, wherein said shape modeler comprises:

means for constructing a tubular coordinate system;

means for determining an initial shape of a surface mesh responsive to a gradient magnitude image in said tubular coordinate system; and

means for modifying said initial surface mesh shape responsive to the gradient of said gradient magnitude image within said tubular coordinate system.

14. (Canceled).

15. (Previously presented) A method of converting collected image data into a viewable image, said method comprising the steps of:

a) deriving image gradient information from collected image data;

b) defining a tubular model of an elongated object;

c) initializing vertices in said tubular model responsive to said derived gradient information; and

d) deforming vertices of said tubular model responsive to smoothing forces and said derived gradient information, wherein the image data is magnetic resonance image data and the step (a) of deriving said image gradient information comprises the steps of:

i) deriving the gradient of magnetic resonance image data;

ii) deriving the magnitude of said derived gradient; and

iii) deriving the gradient of said derived gradient magnitude.

16. (Original) A method as in claim 15, wherein the step (b) of defining said initial tubular model comprises the steps of:

i) defining an object axis;

ii) defining a reference circumferential direction about said object as a function of axial position;

iii) defining radial lines extending outwards from said defined object axis; and

iv) merging intersecting radial lines.

17. (Original) A method as in claim 16, wherein the step (iv) of defining said object axis comprises the steps of:

A) interactively defining object axis points; and

B) interpolating between object axis points.

18. (Original) A method as in claim 17, wherein said interpolation step (B) comprises using a b- spline to connect defined object axis points.

19. (Original) A method as in claim 15, wherein the step (b) of defining said initial tubular model comprises constructing a tubular coordinate system.

20. (Original) A method as in claim 19, wherein the step (c) of initializing vertices comprises determining an initial shape of a surface mesh of said tubular coordinate system responsive to a gradient magnitude image.

21. (Original) A method as in claim 20, wherein the step (d) of deforming vertex locations comprises modifying said initial surface mesh shape responsive to the gradient of said gradient magnitude image.

22. (Currently amended) A method as in claim 15, wherein the tubular object is a blood vessel and the viewable image is a surface of said blood vessel.

23. (Original) A method as in claim 22, wherein the blood vessel is a carotid artery, displaying said viewable image indicating carotid artery stenosis.

24. (Original) A method as in claim 22, wherein the blood vessel is a renal artery, displaying said viewable image indicating renal artery stenosis.

Claims 25 - 32 (Canceled).